

WHAT IS CLAIMED IS:

1. A secondary cell comprising:
a positive electrode and a negative electrode both comprising a solid active material; and
5 an electrolyte layer which has been intervened between the positive electrode and the negative electrode,
wherein at least one of the solid active materials for constituting the positive electrode and the negative electrode is composed of a mixed oxygen ion and electron conductor capable
10 of inserting and eliminating oxygen ion or absorbing and releasing oxygen.
2. The secondary cell as claimed in claim 1, wherein both the solid active materials for constituting the positive electrode and the negative electrode are composed of the mixed
15 oxygen ion and electron conductor.
3. The secondary cell as claimed in claim 1, wherein the mixed oxygen ion and electron conductor is composed of Ceria-Zirconia complex oxide.
4. The secondary cell as claimed in claim 3, wherein the
20 Ceria-Zirconia complex oxide is composed of a composition represented by $\text{Ce}_{4-x}\text{Zr}_x\text{O}_{8-y}$, wherein $1.6 \leq x \leq 2.4$, and $0 \leq y \leq 1.2$.
5. The secondary cell as claimed in claim 4, wherein the Ceria-Zirconia complex oxide indicates respectively one peak,
25 that is, total three peaks with respect to $2\theta = 13.8^\circ\text{--}14.6^\circ$, $36.0^\circ\text{--}37.4^\circ$, and $43.2^\circ\text{--}44.9^\circ$ in a powder X-ray diffraction (XRD) measurement using Cu-K α radiation.

6. The secondary cell as claimed in claim 1, wherein the electrolyte layer is composed of a solid oxygen ion conductor.

7. The secondary cell as claimed in claim 6, wherein all of the solid active material for constituting the positive
5 electrode, the solid active material for constituting the negative electrode, and the electrolyte layer are composed of oxides, and an interface between the positive electrode and the electrolyte layer and an interface between the negative
10 electrode and the electrolyte layer are composed of a gradient composition which gradually changes from one composition to the other composition.

8. The secondary cell as claimed in claim 6, wherein the solid active material for constituting the positive electrode and the negative electrode are composed of Ceria-Zirconia
15 complex oxide, and the electrolyte layer is composed of Zirconia solid solution in which a metal element capable of being bivalent or trivalent metal ion has been substituted and solved.

9. The secondary cell as claimed in claim 6, wherein any of the solid active material for constituting the positive
20 electrode, the solid active material for constituting the negative electrode, and the electrolyte layer has a crystal structure belonging to the same Bravais lattice.